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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/864,308	05/25/2001	Naoki Kuwata	209108US-2	2806
22850	7590	05/03/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.			LANEAU, RONALD	
1940 DUKE STREET			ART UNIT	
ALEXANDRIA, VA 22314			PAPER NUMBER	

2674  
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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/864,308

Applicant(s)

KUWATA ET AL.

Examiner

Ronald Laneau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-21, 25-28 and 30-34 is/are allowed.
- 6) ☒ Claim(s) 22-24, 29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 22-24 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue (US 6,097,836) in view of Kakutani (US 6,304,671).

As per claim 22, Inoue teaches an image processing apparatus that carries out image processing of image data and said image processing apparatus comprising a storage means that stores in advance a relationship between tone values before and after tone correction, an image data correction unit that carries out tone correction of the image data based on the stored relationship, a color reduction process unit that carries out tone correction of the image data based on the stored relationship. Inoue does not teach a color reduction process unit but Kakutani teaches a computer 90 which performs color correction and tone number conversion as the image processing operations that make the input original color image data ORG suited for the color reproduction properties of the image output apparatus such as the printer 22 (col. 15, lines 56-60), furthermore, the computer 90 accordingly converts the image data of 256 tones into two tones and outputs the converted data as the final color image output FNL to the image output apparatus, such as the printer 22 and in addition to the printer 22, the color display 21 may be used as the image output apparatus (col. 16, lines 5-10).

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It would have been obvious to one of ordinary skill in the art to utilize the color reduction process as taught by Kakutani into the device of Inoue because it would provide a high-speed data interpolation technique that is applied to the control operations of a variety of apparatuses and also apply the data interpolation technique to color correction without increasing the error of color correction (col. 3, lines 23-29).

As per claim 23, the color correction taught by Kakutani is capable of carrying out a dispersion-type halftoning process as claimed.

As per claim 29, this is a method claim corresponding to the apparatus claim 22 and is therefore rejected on the same basis as claim 22.

***Allowable Subject Matter***

3. Claims 1-21, 25-28, and 30-34 are allowed.

None of the references, either singularly or in combination, teaches or even suggests the totality of the claimed elements.

As per claims 1-3 and 25, an image processing apparatus comprising an input unit that inputs the image data, a color reduction process unit that sets a display tone value, which is expressible by the liquid crystal display apparatus, with regard to each pixel, based on tone values of the image data, wherein a range of the tone values allocated to each display tone value in at least either one of a high tone region and a low tone region by the color reduction process unit is narrower than that in an intermediate tone region.

As per claims 5-9 and 26, an image processing apparatus and method comprising an image data correction unit that carries out tone correction by taking into account the non-linear

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display characteristic to enhance a tone distribution corresponding to an area of wide intervals, while reducing a tone distribution corresponding to an area of narrow intervals in a tone distribution of input image data, and a color reduction processing unit that divides a range of the tone correction into a preset number of divisions and allocates tone corrected values in each division to each display tone value according to a predetermined rule, so as to implement color reduction.

As per claims 10-20 and 27, an image processing apparatus and method comprising a color reduction process unit that divides a range of tone values of the image data into plural divisions of varying widths corresponding to the non-linear display characteristic and allocates tone values in each division to each display tone value according to a predetermined rule, so as to implement color reduction.

As per claim 21, an image processing apparatus comprising a data generation unit that receives an input of the predetermined parameter, selects a characteristic curve among the plurality of characteristic curves according to the input of the predetermined parameter, and generates data that represents a mapping of tone values of input image data and corrected tone values, based on the selected characteristic curve and the preset characteristic curve, so as to compensate for a difference between the selected characteristic curve and the preset characteristic curve.

As per claim 28, a data generating method comprising the steps of generating data that represents a mapping of tone values of input image data to corrected tone values, based on the characteristic curve specified in the step (a) and the characteristic curve preset in the step (b), so

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as to compensate for a difference between the specified characteristic curve and the preset characteristic curve.

As per claim 30, a computer program product comprises setting a display tone value, which is expressible by the liquid crystal display apparatus, with regard to each pixel, based on tone values of the image data, wherein a range of the tone values allocated to each display tone value in at least either one of a high tone region and a low tone region by the color reduction process unit is narrower than that in an intermediate tone region.

As per claim 31, a computer program product comprises carrying out tone correction by taking into account the non-linear display characteristic to enhance a tone distribution corresponding to an area of wide intervals, while reducing a tone distribution corresponding to an area of narrow intervals in a tone distribution of input image data, and dividing a range of the tone correction into a preset number of divisions and allocating tone corrected values in each division to each display tone value according to a predetermined rule, so as to implement color reduction.

As per claim 32, a computer program product causing a computer to attain the functions of dividing a range of tone values of the image data into plural divisions of varying widths corresponding to the non-linear display characteristic and allocating tone values according to a predetermined rule, so as to implement color reduction.

As per claim 33, a computer program product causing a computer to attain the functions of presetting a characteristic curve that represents a desired relationship between the tone value of the image data and the lightness; and generating data that represents a mapping of tone values of the image data to corrected tone values, based on the specified characteristic curve and the

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preset characteristic curve, so as to compensate for a difference between the specified characteristic curve and the preset characteristic curve.

As per claim 34, a recording medium wherein an image display apparatus having a less number of expressible display tones with regard to each pixel than a number of tones included in the image data, giving output lightness that varies stepwise against display tone value, and having a non-linear display characteristic that provides the output lightness at varying intervals.

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Wang et al (US 6,717,696) teach systems and methods for moiré-reduced halftoning wherein a resultant halftone image can be achieved by reducing moiré patterns.
- Ishida et al (US 2002/0059460) teach an image processing system wherein the system causes input image data to be subjected to a tone correction process and a halftoning process according to display characteristics of the terminal.
- Inoue (US 6,346,994) teach an image processing system and its smoothing method for correcting color fog and backlight of a digital image.
- Ishida et al (US 6,714,204) teach an image processing system wherein the system causes input image data to be subjected to a tone correction process and a halftoning process according to display characteristics of the terminal.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald Laneau whose telephone number is 703-305-3973. The

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examiner can normally be reached on Monday-Thursday from 8:00 AM to 6:00 PM or via email: [ronald.laneau@uspto.gov](mailto:ronald.laneau@uspto.gov).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached at 703-305-4709.

**6. Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:**


**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Ronald Laneau  
Examiner  
Art Unit 2674

rl  
April 20, 2004



**RICHARD HJERPE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600**